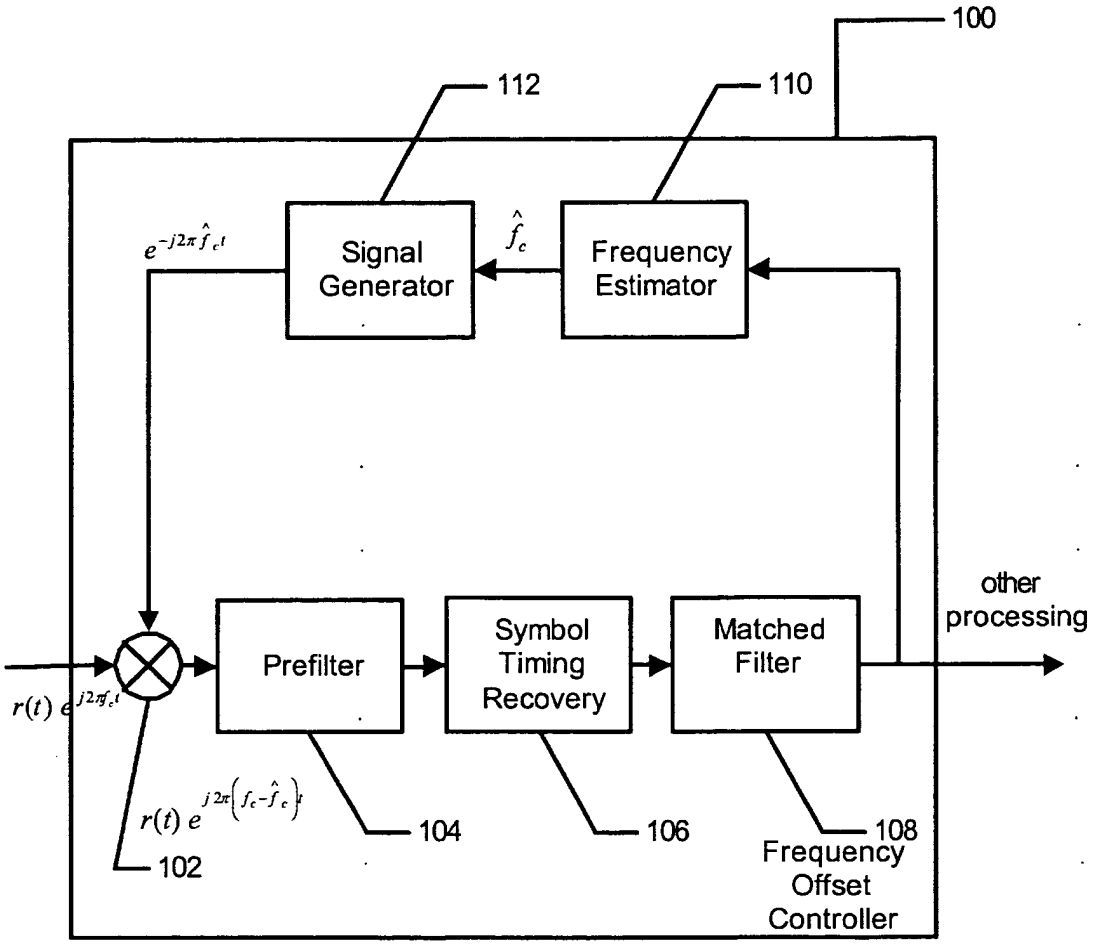
100
112
110
Signal Generator
Frequency Estimator
$e^{-j2\pi \hat{f}_c t}$
$\hat{f}_c$
Prefilter
Symbol Timing Recovery
Matched Filter
other processing
$r(t)\,e^{j2\pi f_c t}$
$r(t)\,e^{j2\pi\left(f_c-\hat{f}_c\right)t}$
102
104
106
108
Frequency Offset Controller

Figure 1

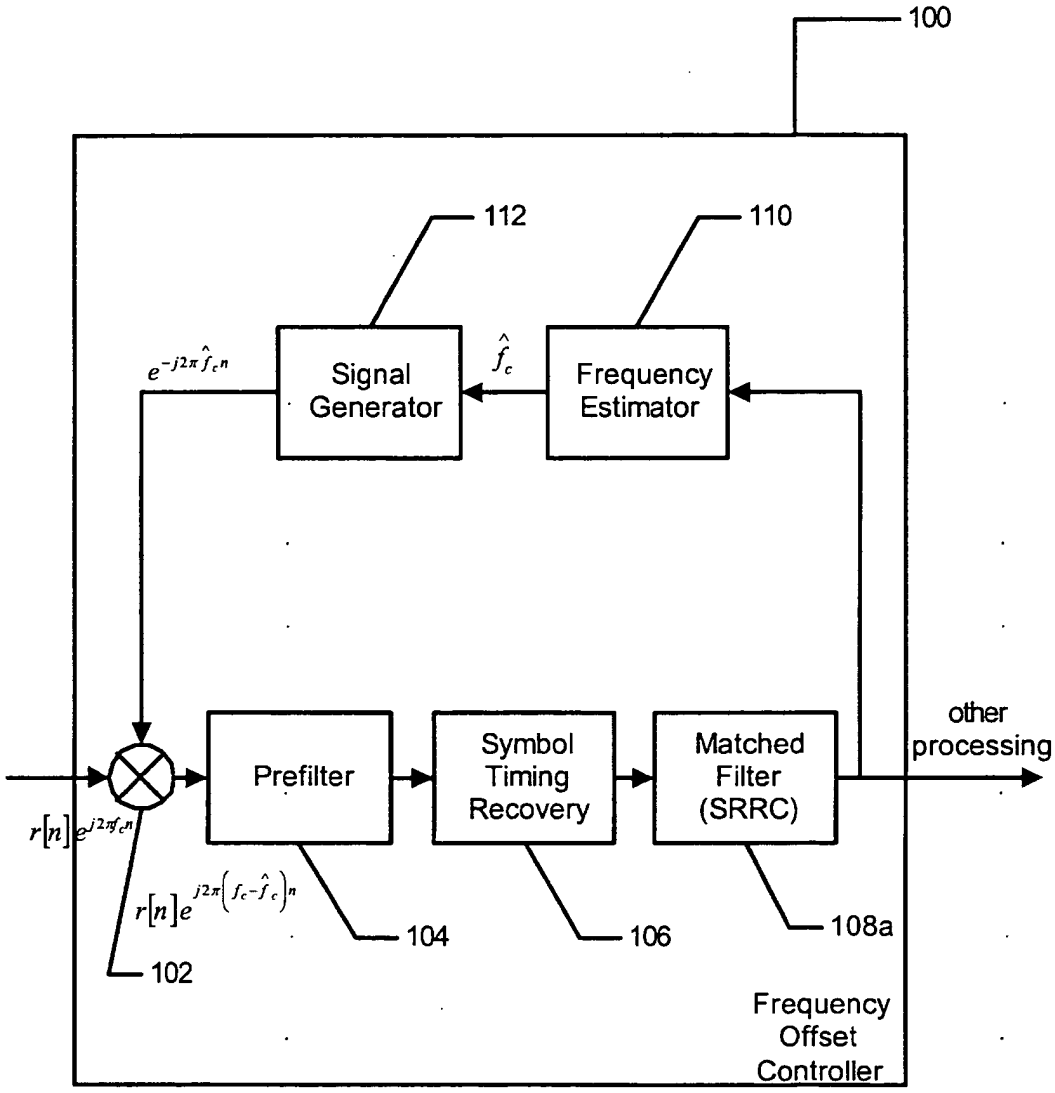
100
112
110
Signal Generator
Frequency Estimator
$e^{-j2\pi\hat{f}_c n}$
$\hat{f}_c$
Prefilter
Symbol Timing Recovery
Matched Filter (SRRC)
other processing
$r[n]e^{j2\pi f_c n}$
$r[n]e^{j2\pi\left(f_c-\hat{f}_c\right)n}$
102
104
106
108a
Frequency Offset Controller

Figure 2

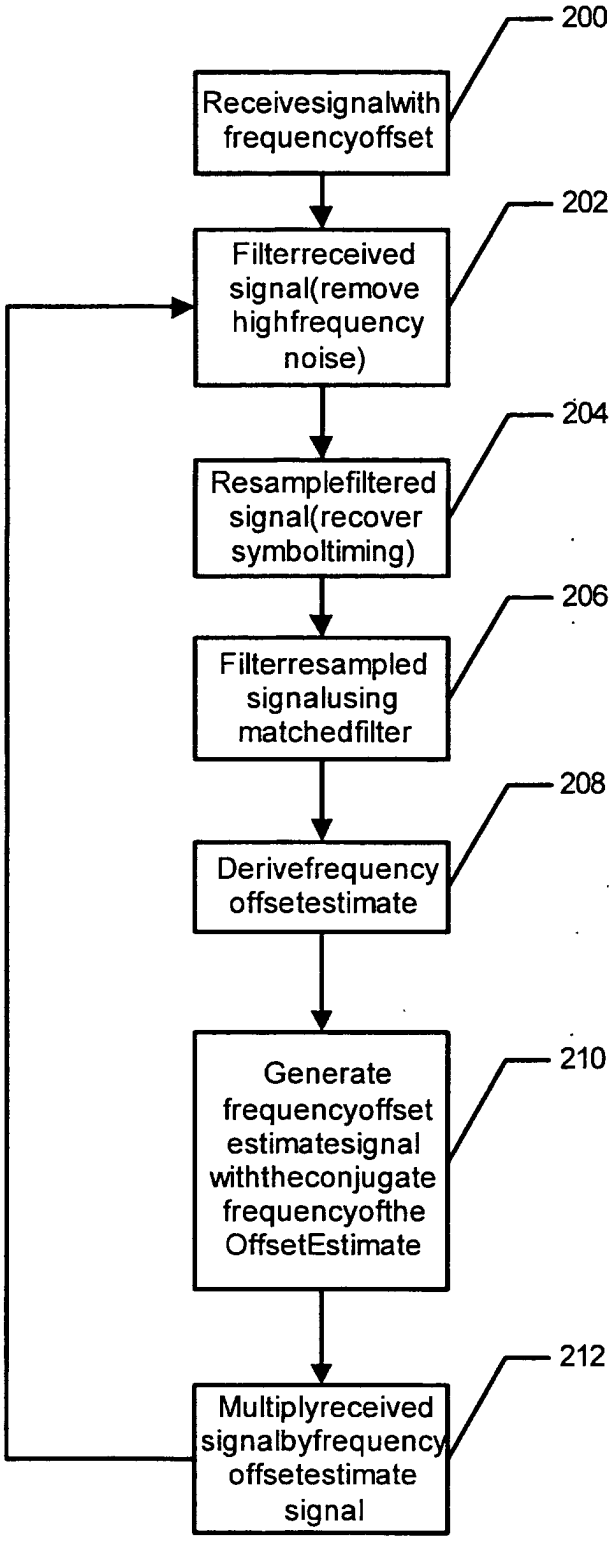
200
Receivesignalwith frequencyoffset
202
Filterreceived signal(remove highfrequency noise)
204
Resamplefiltered signal(recover symboltiming)
206
Filterresampled signalusing matchedfilter
208
Derivefrequency offsetestimate
210
Generate frequencyoffset estimatesignal withtheconjugate frequencyofthe OffsetEstimate
212
Multiplyreceived signalbyfrequency offsetestimate signal

Figure 3

Figure 4
10 Mbaud symbol rate

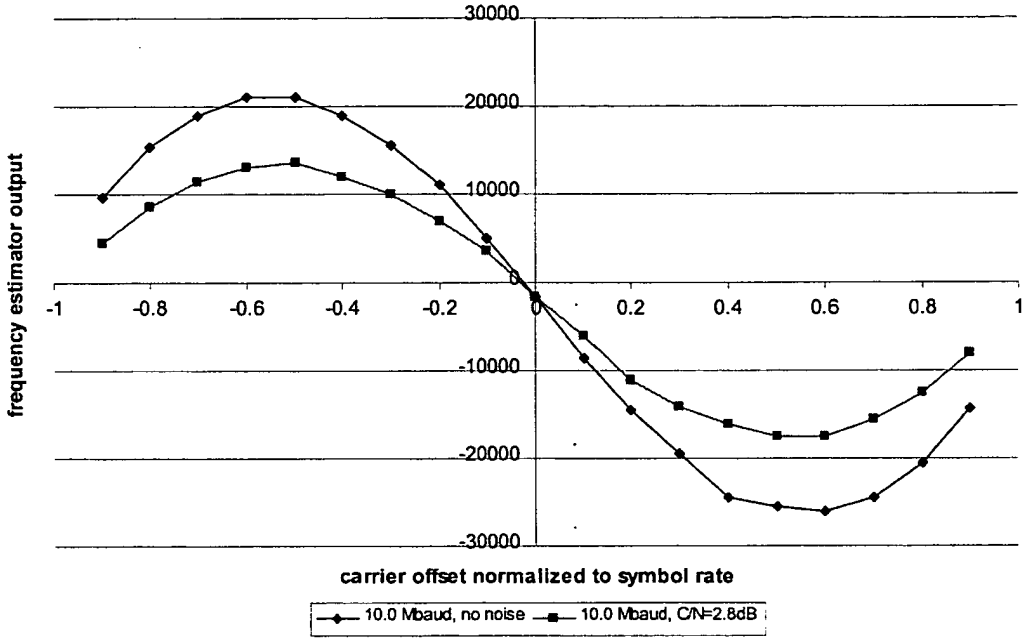

Figure 5
15.0 Mbaud symbol rate

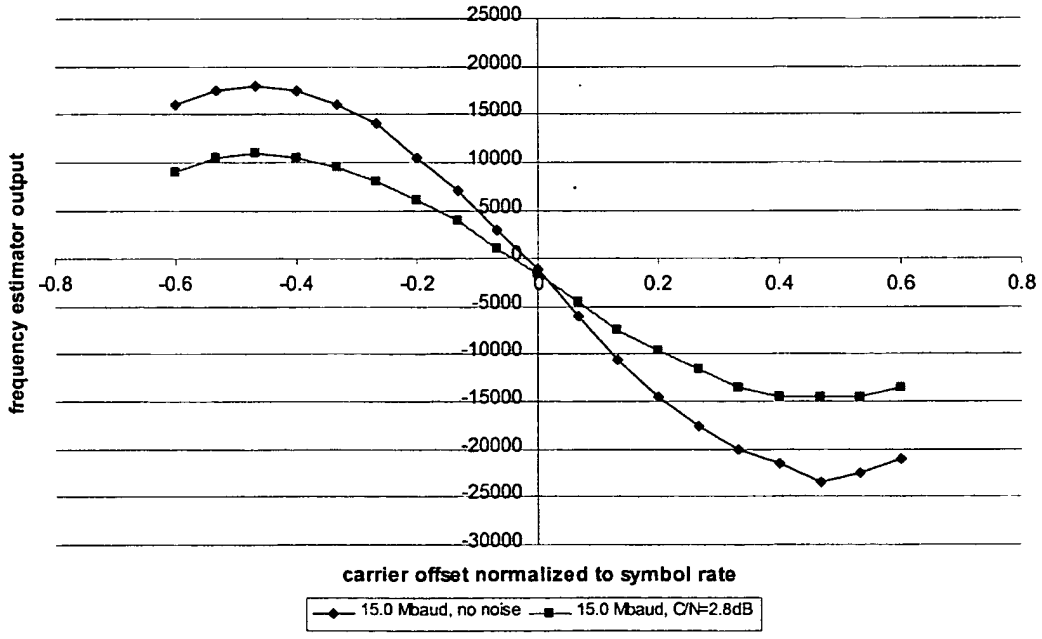

Figure 6
21.7 Mbaud symbol rate

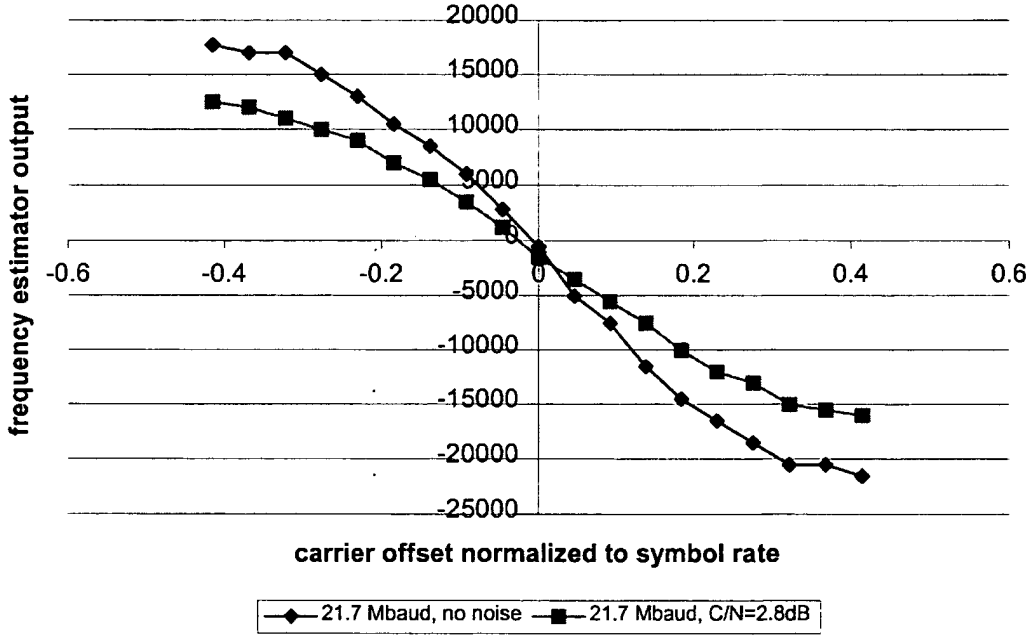

Figure 7
25.0 Mbaud symbol rate

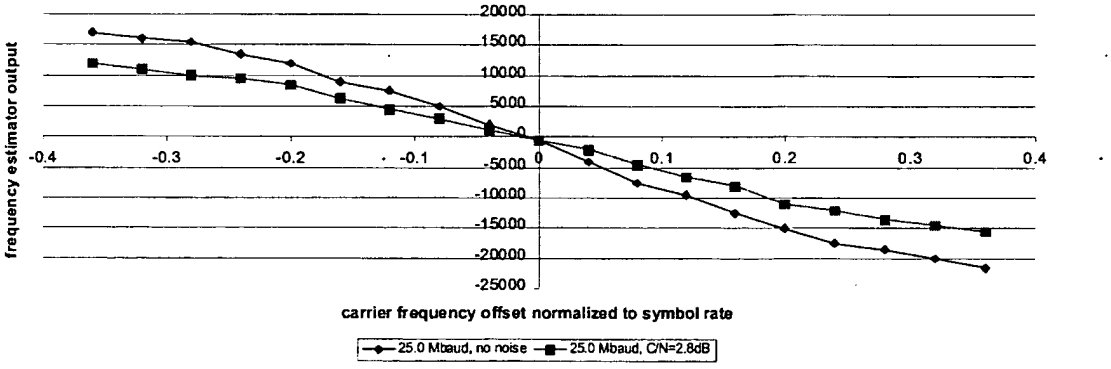

Figure 8
25.0 Mbaud symbol rate

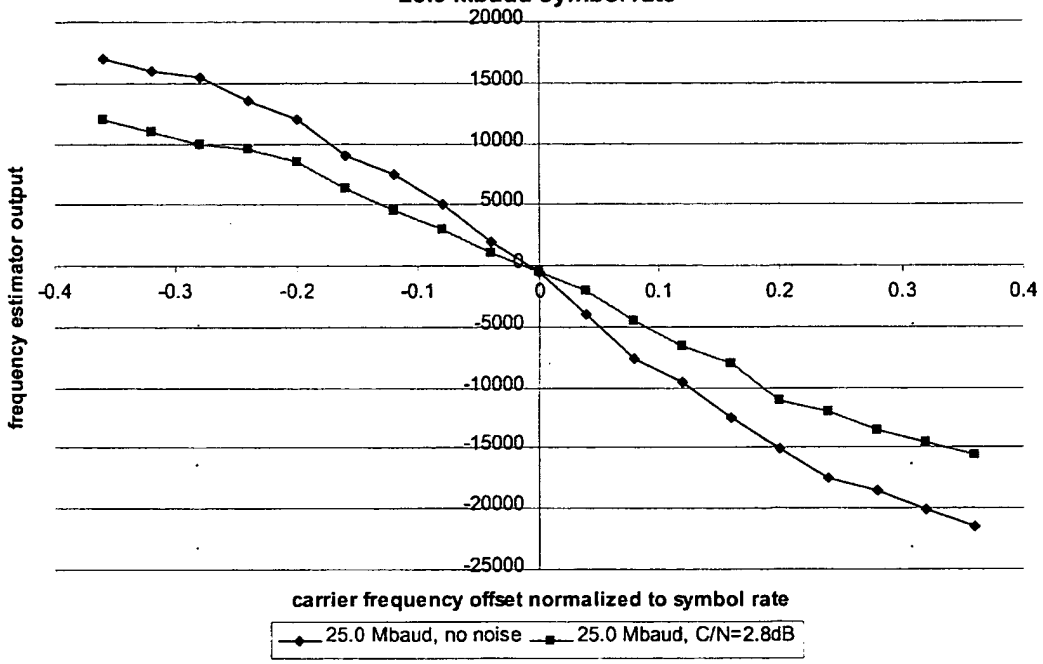
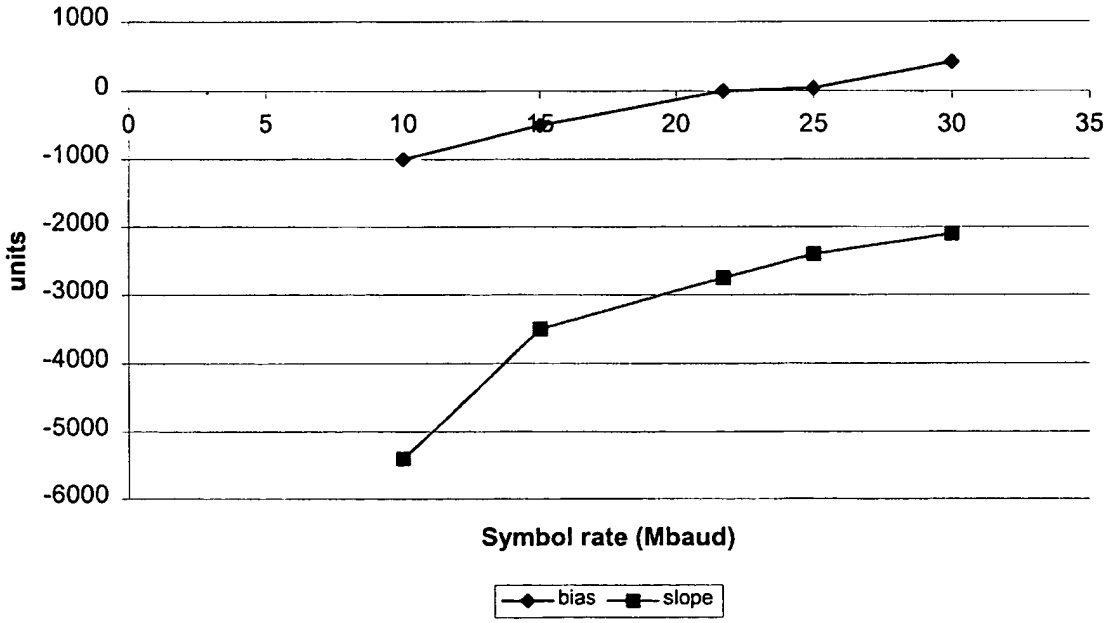
Figure 9
Calibration curves of frequency estimator as a function of symbol rate